Translation

PCT/JP2003/015838

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P0656PC	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/JP2003/015838	International filing date (*day/month/year*) 11 December 2003 (11.12.2003)	Priority date (*day/month/year*) 09 January 2003 (09.01.2003)
International Patent Classification (IPC) or national classification and IPC G06F 9/46		
Applicant JAPAN SCIENCE AND TECHNOLOGY AGENCY		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 13 sheets, as follows:

      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

   ☒ Box No. I Basis of the report
   ☐ Box No. II Priority
   ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   ☐ Box No. IV Lack of unity of invention
   ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   ☐ Box No. VI Certain documents cited
   ☐ Box No. VII Certain defects in the international application
   ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 07 April 2004 (07.04.2004)	Date of completion of this report 23 August 2004 (23.08.2004)
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/JP2003/015838

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is language of a translation furnished for the purpose of:

☐ international search (under Rules 12.3 and 23.1(b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ The international application as originally filed/furnished

☒ the description:

pages 1-13, as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages 5-9, 11-13, as originally filed/furnished
pages* _____, as amended (together with any statement) under Article 19
pages* 1-3, 10, 14, 15 received by this Authority on 23 July 2004 (23.07.2004)
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-8, as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☒ the claims, Nos. 4
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/JP03/15838

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-3, 5-15	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-3, 5-15	NO
Industrial applicability (IA)	Claims	1-3, 5-15	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Document 1: "Parallel Replacement Mechanism for MultiThread, Advances in Parallel and Distributed Computing," (C. Guangzuo, et al.), 1997 Proceedings, 1997, pages 338-343; especially see page 340 and Figure 31
Document 2: "Pica: An Ultra-Light Processor for High-Throughput Application, Computer Design: VLSI in Computers and Processors," (D. S. Wills, et al.), 1993 ICCD '93 Proceedings, 1993, pages 410-414; especially see pages 411-412
Document 3: JP, 2002-533807, A (Koninklijke Philips Electronics N.V.), 8 October, 2002, (08.10.02), paragraphs [0010]-[0016]
Document 4: JP, 2002-513182, A (Infineon Technologies North America Corp.), 8 May, 2002 (08.05.02), page 12, line 14 to page 17, line 9
Document 5: JP, 3-9431, A (NEC Corp.), 17 January, 1991 (17.01.91), full text

Claims 1-3, 5, 10, 11, 14 and 15

Document 1 discloses a context changeover apparatus connected to a register (register file) and comprising (1) a restore bus and a save bus, (2) two temporary register sets (temporary register sets) for temporarily buffering contexts and (3) a control unit (thread control unit), for concurrently executing the saving and restoring of contexts through the restore bus and the save bus.

Document 2 discloses a technique in which (1) a context is searched based on a context ID (thread identifier), for specifying the context to be replaced, and (2) a context cache is accessed. Furthermore, being single cycle task swaps is described.

Document 3 also discloses a technique for managing a context for each thread as in document 2, and it is considered to be obvious for a person skilled in the art to manage contexts based on thread identifiers, based on this description. Furthermore, the document describes that it is suitable that a processor, a memory and buses are formed on a common silicon board. (Document 3 also discloses the relation between threads and the addresses in a cache, though this is not clear in the claims of the present application.)

The temporary register sets and the main memory where contexts are finally stored, disclosed in document 1, are considered as kinds of context caches. In this case, the constitution, in which a read port and a write port are established in correspondence to a restore bus and a save bus, is considered to be obvious for a person skilled in the art.

Furthermore, the constitution, in which threads and contexts are related to each other using thread identifiers for management, is described in documents 2 and 3. Moreover, a person skilled in the art could have easily mounted a context cache as a chip in a central processing unit, from the description of document 3.

Therefore, a person skilled in the art could have easily arrived at the subject matters of claims 1-3, 5, 10, 11, 14 and 15 based on the descriptions of documents 1-3.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: V

Claims 8 and 9

Document 4 discloses a microprocessor comprising an instruction control unit 101, an integer execution unit 102, a load/store unit 103, an instruction memory 300, a data memory 200, and a peripheral unit 400. A person skilled in the art could have easily installed an instruction cache, data cache, instruction fetch unit, arithmetic and logic unit, memory access unit, and arithmetic bus based on the description of document 4, in the context changeover apparatus that a person skilled in the art could have easily conceived of from the already discussed documents 1-3.

Claims 6, 7, 12 and 13

Document 5 discloses a technique for issuing a save instruction (backup instruction) and a restore instruction (restore instruction) for switching contexts. A person skilled in the art could have easily installed the above instructions described in document 5 in the context changeover apparatus that a person skilled in the art could have easily conceived of from the already discussed documents 1-4.